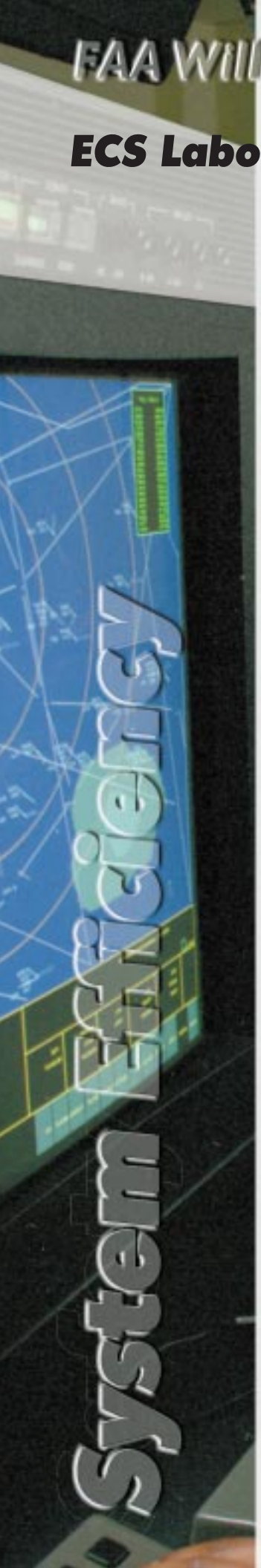
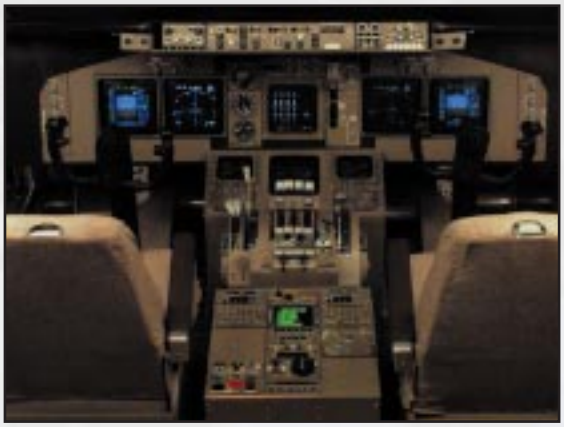
ECS Laboratory

The Engineering Cockpit Simulator (ECS) Laboratory is located on the fourth floor of the hanger (Building 301) at the FAA William J. Hughes Techncial Center.



The laboratory currently consists of a transport aircraft cockpit with all instrumentation and flight dynamics driven by a network of Silicon Graphics (SGI) workstations. There are approximately 11 SGI workstations in the laboratory (1 IRIS 4D/320VGX, 3 Onyx (2 processor), 2 Indys, 3 Indigo2s, and 2 Indigos). The ECS uses a software package distributed by CTA Simulation Systems called Mission Simulator Software (MSS) to model flight dynamics and depict aircraft instruments and terrain visual scenes. The software is flexible, allowing the simulation of nearly any commerical transport aircraft. The ECS uses five networked SGI machines to simulate a given aircraft along with an out-the-window display. The system currently simulates a Boeing 747-400 aircraft.

The additional machines can be used to model additional aircraft (players) in the simulation. Each machine can represent an individual (type selectable) aircraft that can be flown in an autopilot mode with a visual presentation of the mode control panel, flight management system, instrumentation, and a visual scene. Each player can be operated independently from a separate workstation and is visible as aircraft traffic in the visual scene of the ECS. Thus, very many aircraft simulations are possible within the ECS laboratory if experimental need warrants.



This entire system is tied via a network (TCP/IP) to the ATC simulation laboratory in the T&A building. This allows the ECS and its players to be targets (including voice communication) within any ATC simulation. ATC audio from a geographically appropriate FAA center is digitally copied into a PC from the center backup tape. The audio is edited to create control audio for the players and is mixed with background audio to create a highly realistic flight audio experience.

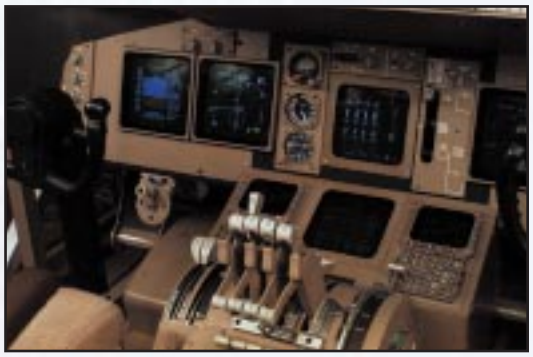
The laboratory also contains peripheral equipment to support the activities in the laboratory–color scanner, color postscript printer, optical disk drive, several PCs, and a laser engraver for building instrumentation panels.

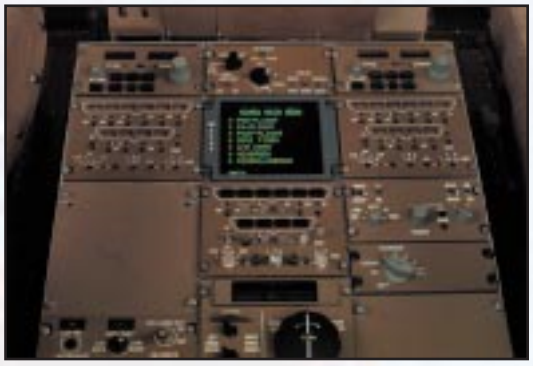
Classified as a flight training device, the ECS is a medium-fidelity flight simulator that uses high-resolution computer-generated images to graphically depict airplane controls and displays that are located on the forward instrument panel. To increase fidelity, some aircraft components were installed including throttle quadrant, flight mode control panel, flight management system CDUs, control yokes, landing gear handle assembly, and rudder pedals.

Software for the ECS is modular and is set up to emulate the major functions of the aircraft. Major modules currently developed include a 6 degree of motion model which performs approximately 90% of the actual flight functions, a flight management system with vertical and navigation management functions, a radio module that emulates terrestrial and satellite navigation plus a three-solution inertial navigation system, and a line replaceable unit (LRU) module that performs engine management and control functions.

Remote Flight Simulator Network

A high-speed network has been installed from the Technical Center to various points in the USA and Europe. A total of 24 connections are possible with enough channel capacity on each channel to remotely connect a flight simulator with position, voice, and data link data to the Technical Center's ATC labs. The list of flight simulators below include flight simulators that are currently on the network, or have been, and the telephone circuit, if it is still in place.





For additional information, contact:

Federal Aviation Administration
William J. Hughes Technical Center
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Phone: (609) 485-5733
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Site/Location	Aircraft Type
1. AVIA/Torrence,Ca.	B-727-100
2. BOEING/Renton,Wa.	B-747-400
3. DELTA/Atlanta, Ga.	B-737-100
4. DELTA/Atlanta, Ga.	B-737-300
5. FAA/Oklahoma City, Ok.	B-727-200
6. GAT/FAA Atlantic City, NJ	Cessna-421
7. NASA/Moffett Field Ca.	B-747-400
8. NLR/Holland	B-747- 100/200/400
9. TWA/St Louis,Mo.	B-767-200ER
10. ECS/FAA Atlantic City,NJ	Various
11. UNITED/Denver,Co.	B-747-400
12. CONTINENTAL/Houston,Tx	B757 (not on line)
13. CONTINENTAL/Houston,Tx	B737-500 (not on line)